

**UNITED STATES DISTRICT COURT
NORTHERN DISTRICT OF INDIANA
HAMMOND DIVISION**

UNITED STATES OF AMERICA)
)
Plaintiff,)
)
v.)
) No. 2:10 CR 217
UNITED WATER ENVIRONMENTAL)
SERVICES, INC., DWAIN L. BOWIE,)
and GREGORY A. CIACCIO,)
)
Defendants.)

OPINION AND ORDER

Before me are cross motions to exclude a rash of experts that each party has retained and plan to call at the upcoming trial. I conducted a two-day hearing on the admissibility of the experts' testimony. The parties then supplemented their motions with post-hearing briefing. I find that all of the experts are well-qualified and present testimony that will be helpful to the jury. The shortcomings that the experts may have go to the weight of their testimony, not to its admissibility. As usual, cross-examination, not outright exclusion, is the best way to expose those shortcomings. All of the motions will therefore be denied.

BACKGROUND

Defendants, United Water Services, Inc., Dwain L. Bowie, and Gregory A. Ciaccio are charged with one count of conspiracy to violate the Clean Water Act and 25 substantive counts. *See* 18 U.S.C. § 371 and 33 U.S.C. § 1319(c)(4) [DE 1]. According to the indictment and the evidence presented at the hearing, United Water contracted with the Gary Sanitary District (“GSD”) to run the GSD water treatment plant in Gary, Indiana. The plant was to be run in compliance with The Clean Water Act, which established a nationwide permit program, called

the National Pollutant Discharge Elimination System (“NPDES”), that placed limits on pollutants that can be discharged into U.S. waterways. 33 U.S.C. § 1342. According to the indictment, the Indiana Department of Environmental Management issued a NPDES permit to GSD in both 1994 and 2006 [DE 1 at ¶ 14].

Under those permits, GSD was permitted to discharge treated effluent – in this case, *E. Coli* – from its plant, subject to effluent limitations, and so long as the monitoring methods in the permits were complied with. No specific method of disinfection was required by the permits. Chlorine is one method of disinfection utilized by wastewater treatment plants, but the permits do not mandate the use of chlorine, nor do they mandate the amount of chlorine. To monitor compliance, the permits required that a single “grab” sample had to be taken each day and tested to determine the *E. Coli* concentration [DE 62 at 6].

The 2006 permit required that all samples must be “representative of the volume and nature of the monitored discharge flow and shall be taken at times which reflect the full range and concentration of effluent parameters normally expected to be present” [DE 1 at ¶ 14(D); DE 62 at 2]. The 1994 permit contains similar language [DE 62 at 2]. The 2006 permit also requires that samples “not be taken at times to avoid showing elevated levels of any parameters” [DE 1 at ¶ 14(E); DE 62 at 2].

The essential allegations of the indictment are that the Defendants concocted a scheme to obtain favorable *E. Coli* test results by increasing the amount of chlorine used when the GSD’s daily sample was taken, and then decreasing the amount of chlorine used the rest of the day. As noted, Count I of the indictment charges the Defendants with conspiring to “knowingly tamper with a monitoring method required to be maintained by the Clean Water Act, in violation of the

Clean Water Act, 33 U.S. § 1319(c)(4).” The remaining counts of the indictment allege that the Defendants committed 25 separate instances of tampering with a monitoring method in violation of 33 U.S.C. § 1319(c)(4) and 18 U.S.C. § 2.

Both parties filed notices of proposed expert testimony. The Defendants propose two experts, Dr. George Tchobanoglous and Charles Hurst, to testify that they have reviewed all data available from the time of the charged conspiracy and that during that time, the Defendants were achieving a “good kill” of *E. coli*, and that therefore, the Defendants’ actions in increasing and decreasing chlorine levels did not affect the representativeness of the grab sample [DE 193 at 31]. Essentially, the defense proffers that Dr. Tchobanoglous and Dr. Hurst will testify that based on their review of the data, GSD had an effective disinfection rate at all times, not just at the time the grab sample was taken. Both experts testified at the August hearing that the presence of a free chlorine residual at the end of a sizeable chlorine contact tank means that an effective disinfection of bacteria has been achieved. Since GSD maintained that effective disinfection, the Defendants contend that the samples taken were representative of the same results that would have been obtained at all times during the day.

The Government has proffered the testimony of Trent Rainey to “help the jury understand the disinfection process and the significance of the correlation between chlorine concentration and sampling time” [DE 195 at 34]. The Government has also proffered the testimony of Dr. David Jenkins to “help the jury understand patterns in chlorine concentration” [DE 195 at 34-35]. Essentially, Dr. Jenkins’ testimony is that on the dates charged in the indictment, the *E.coli* sample was taken at a time when the chlorine levels were high and the water levels were low. The Government contends that both experts will provide “important

background context about how disinfection works and specific insight into how Defendants tampered with a monitoring method by manipulating chlorine levels” [DE 195 at 35]. Neither party contests the credentials of any of these experts, and for good reason. All four of these experts are well-qualified in the science of wastewater treatment.

Additionally, the Government has proffered the testimony of Michael Kuss, a former IDEM Wastewater Compliance Engineer who participated in regulatory oversight of the GSD plant, to testify about the general framework of the Clean Water Act, how IDEM implemented and enforced the NPDES permits, and the operation of the GSD plant [DE 96 at 7-11].¹ Unlike the other four experts, the Defendants do contend that Mr. Kuss is unqualified to render the opinions that he offers.

As usual, I will start with the law that governs these motions and then I will consider the testimony of each expert.

II. DISCUSSION

The admissibility of expert testimony is governed by Federal Rule of Evidence 702 and *Daubert v. Merrell Dow Pharmaceuticals*, 509 U.S. 579 (1993). Federal Rule of Evidence 702 states:

A witness who is qualified as an expert by knowledge, skill, experience, training, or education may testify in the form of an opinion or otherwise if: (a) the expert’s scientific, technical, or other specialized knowledge will help the trier of fact to understand the evidence or to determine a fact in issue; (b) the testimony is based on sufficient facts or data; © the testimony is

¹The Government included in its notice of Kuss’ proposed testimony that he would state that “POTWs, municipally-owned sewage treatment plants, are major sources of water pollution” [DE 96 at 9]. The Defendants objected to this testimony [DE 113], and the Government responded that it would not elicit that testimony from Kuss [DE 125 at 3, n.3]. That portion of the Defendants’ motion to exclude Kuss [DE 113] will thus be **GRANTED**.

the product of reliable principles and methods; and (d) the expert has reliably applied the principles and methods to the facts of the case.

Rule 702 is the Federal Rule of Evidence that was promulgated in the wake of *Daubert*.

The *Daubert* framework requires a district court to determine whether the expert's testimony is both reliable and relevant. In particular, the district court must determine whether (1) the proposed witness would testify to valid scientific, technical or other specialized knowledge; and (2) his testimony will assist the trier of fact. *Ammons v. Aramark Uniform Servs., Inc.*, 368 F.3d 809, 816 (7th Cir. 2004). The "reliability" factor includes a determination of "whether the expert is qualified in the relevant field and whether the methodology underlying the expert's conclusions is reliable." *Id.* (citation and internal quotations omitted). Anyone with relevant expertise enabling him to offer responsible opinion testimony helpful to the jury may qualify as an expert witness. See Fed. R. Evid. 702; *United States v. Navarro*, 90 F.3d 1245, 1261 (7th Cir. 1996). Under *Daubert*, my focus "must be solely on principles and methodology, not on the conclusions they generate." *Chapman v. Maytag Corp.*, 297 F.3d 682, 687 (7th Cir. 2002).

Rule 702 and *Daubert* makes me the "gatekeeper" with respect to the screening of expert testimony. *Kumho Tire Co., Ltd. v. Carmichael*, 526 U.S. 137, 147-48 (1999) (citing *Daubert*, 509 U.S. at 589). Because experts come in all shapes and sizes, the *Daubert* framework is necessarily a flexible one that must be adapted to the particular circumstances of the case and the type of testimony being proffered. *Mihailovich v. Laatsch*, 359 F.3d 892, 919 (7th Cir. 2004). As the Supreme Court elaborated, the objective "is to ensure the reliability and relevancy of expert testimony. It is to make certain that an expert, whether basing testimony upon professional studies or personal experience, employs in the courtroom the same level of

intellectual rigor that characterizes the practice of an expert in the relevant field.” *Kumho*, 526 U.S. at 152. District judges are afforded substantial discretion in making these determinations. *Roback v. V.I.P. Transp. Inc.* 90 F.3d 1207, 1215 (7th Cir. 1996).

To assess the reliability of an expert witness, the Supreme Court directed district courts to consider four non-exclusive factors: “(1) whether the scientific theory can be and has been tested; (2) whether the theory has been subjected to peer review and publication; (3) the theory’s known or potential rate of error when applied; and (4) whether the theory has been ‘generally accepted’ in the scientific community.” *Fuesting v. Zimmer, Inc.*, 421 F.3d 528, 534 (7th Cir. 2005) (citing *Daubert*, 509 U.S. at 593-94), *vacated on other grounds*, 448 F.3d 936 (7th Cir. 2006). But as alluded to above, because not all expert testimony can be neatly examined under the factors set forth in *Daubert*, the factors are “neither definitive nor exhaustive, but rather flexible to account for the various types of potentially appropriate expert testimony.” *Deputy v. Lehman Bros., Inc.*, 345 F.3d 494, 505 (7th Cir. 2003) (citing *Kumho*, 526 U.S. at 141). Thus, the *Daubert* factors may not apply in every instance.

I. The Government’s Proposed Experts

A. The Defense Objection to the Government Experts “Summary” Testimony

The Defendants first argue that Rainey and Dr. Jenkins are only reciting facts, and are not providing “expert opinion” testimony [DE 193 at 35]. According to the Defendants, Rainey and Dr. Jenkins are simply summarizing GSD data and providing observations about the operation of wastewater treatment plants generally, as opposed to offering expert opinion and analysis [DE 193 at 35; DE 200 at 20-21].

Rainey testified that based on his review of the data from 33 days that he reviewed, the

highest flow rate occurred between 10 a.m. and 5 p.m. or midnight and 3 a.m. [Tr. 2 at 17]²; that the average of all free chlorine residual measurements was .5 mg/L [Tr. 2 at 22]; that the grab samples were typically taken during the morning hours [Tr. 2 at 24]; and that on 21 of the 33 days, the free chlorine residual at the time of sampling was between .72 mg/L and 2.2 mg/L [Tr. 2 at 25-26]. The Defendants argue that this testimony is just a summary of the facility records, and Rainey is not providing any expert testimony.

According to the Government, Rainey testified about “general principles of chlorination at treatment plants and the fact that chlorine concentrations at treatment plants should remain fairly constant” [DE 195 at 38]. The Government contends that Rainey’s testimony will shed light on the chlorination practices at the GSD plant and show the jury how sampling times coincided with higher concentrations of chlorine [DE 195 at 38]. Additionally, Rainey offered testimony explaining some of the concepts that underlie the Government’s case against the Defendants: general water disinfection practices [Tr. 2 at 12-14]; the general set up and operation of the GSD plant [Tr. 2 at 63-64]; water flow concepts Tr. 2 at 44]; general information about sodium hypochlorite or chlorine [Tr. 2 at 19]; how pumps work in the context of disinfection [Tr. 2 at 19-20]; and how chlorine testing works [Tr. 2 at 39].

Similarly, Dr. Jenkins testified that he reviewed data for 49 days, and based on that data, he observed 1) the flow of water into the GSD plant is relatively flat; 2) at the sampling time, the inflow was not usually at its highest point; 3) higher chlorine pump rates were associated with

² The hearing on expert testimony was held on August 6 and 7, 2012. The August 6 transcript can be found at docket entry 216; the transcript from the August 7 proceedings can be found at docket entry 217. For convenience, I will cite the August 6 transcript as “Tr.” and the August 7 transcript as “Tr. 2.”

sampling times; and 4) higher chlorine concentration was associated with sampling times [DE 195 at 35-36; Tr. 225-28, 230-31]. In sum, Dr. Jenkins testified that the grab sample – *i.e.*, the monitoring method – was taken when the water was at its lowest mark and the chlorine was at its highest, and that after the sample was taken, the chlorine level was reduced. Again, the Defendants argue that this testimony is only a summary of the GSD plant data, and that it lacks the type of analysis that qualifies testimony as an expert opinion.

The Defendants’ characterization of this testimony as merely “summary” testimony is an oversimplification of the analysis done by Dr. Jenkins and Rainey. Both witnesses reviewed the data available to them and used that data – coupled with their expertise in the wastewater treatment field – to opine on the effects of the flow rates of water into the plant and the chlorine dosing rates vis-a-vis the taking of the grab sample. The operation of a wastewater treatment facility is a complex undertaking. Both Rainey and Jenkins were able to contextualize the information in a way that I find will assist the jury in understanding the data collected on a daily basis at GSD relating to flow rates and chlorine usage, and what that data means in the context of the specific charges in this case. The Government will be permitted to present this expert testimony.

The Defendants also object to Rainey’s proffered testimony that there are a “variety of approaches” that wastewater treatment plants can use to achieve adequate disinfection, “one of which is to maintain a fairly constant chlorine disinfection in the chlorine contact tanks” [DE 193 at 38; Tr. 2 at 12]. The Defendants argue that this is not an opinion, and that it is simply a summary of Rainey’s experience. The Defendants contend that the testimony is irrelevant because Rainey was not familiar with the operation of the GSD plant and that GSD was not

required by law to maintain a constant free chlorine residual, and that permitting this testimony would allow the government to imply that the Defendants' failure to maintain a constant chlorine residual was somehow improper [DE 193 at 38; DE 200 at 21].

The Defendants' objections to Rainey's testimony are unfounded. Rainey is certainly qualified to testify regarding proper wastewater treatment and disinfection procedures. The Defendants are correct that it was not necessarily nefarious for them to fail to maintain a constant chlorine concentration at all times. But Rainey's testimony that they failed to do so and that such a failure was not consistent with a chlorine concentration disinfection approach is certainly relevant to whether or not the Defendants were tampering with the monitoring method. The Government will not be allowed to belabor the point, and the Defendants are free to re-raise any relevance objections at trial, if any Rule 403 concerns are implicated. But for now, Rainey will be conditionally allowed to testify on this point.

B. The Defense Objections to the Prejudicial Effect of the Government's Proposed Expert Testimony

The Defendants also argue that even if the Court finds that Rainey and Jenkins' testimony is proper expert opinion, the slight probative value of the testimony is significantly outweighed by the danger of unfair prejudice under Federal Rule of Evidence 403, because of Jenkins' and Rainey's lack of opinions regarding effectiveness of disinfection and representativeness [DE 193 at 39]. The Defendants argue that because Rainey and Dr. Jenkins were only asked to analyze the chlorine residuals, and not *E. Coli* concentrations, that the jury could misunderstand their testimony as implying that at the times that chlorine residuals were low, there was not effective disinfection [DE 193 at 39-40].

The probative value of Rainey and Jenkins' testimony is not substantially outweighed by the danger of unfair prejudice. The Defendants claim that the Government "clearly seeks to

imply . . . that the lower chlorine residuals at times other than when the Defendants were sampling for *E. Coli* are evidence that the *E. Coli* concentrations were higher at those other times” [DE 193 at 40]. The potential that the Defendants are concerned about can be cured through vigorous cross-examination. Indeed, as Rainey freely admitted during his cross-examination at the hearing, “[o]nce all the *E. Coli* are dead . . . they are dead, and adding more chlorine does not kill them more” [Tr. 2 at 58]. The danger that the jury could confuse this testimony is virtually non-existent. Rather than confuse the issues, Rainey’s testimony will aid the jury in understanding proper wastewater treatment procedures and the relationship between chlorine disinfection and *E. Coli*.

The parties have a fundamental difference about the data set that the experts should be examining: the Government contends that only the dates specifically charged in the indictment are relevant, whereas the Defendants argue that the indictment, which alleges that the Defendant participated in a conspiracy to tamper with a monitoring method “between approximately June 2003 and October 2008,” puts at issue each of the 1,223 days subject to the GSD permit requirements. The Government’s experts have analyzed data only from some of the specific dates charged in the indictment; the Defendant’ experts have analyzed data from the years that the conspiracy is alleged to have been in effect, from 2003 through 2008. The Defendants argue that their conduct on each of those days is relevant to the existence of the conspiracy, and as a result, the testimony of Rainey and Dr. Jenkins is so limited that it would be unhelpful to the jury. (Unsurprisingly, as discussed below, the Government argues that the defense experts’ testimony is overbroad.) Neither party has cited any cases supporting its position.

I find that the Government’s experts’ testimony is not so narrow in scope that it would be unhelpful to the jury. The Government may present the information gathered from the days

charged in the indictment, and need not present information for other days (and, as we will see below, the defense is free to present that information if it chooses to do so). The Defendants' objections to this testimony are not sufficient to exclude the opinions entirely. Rainey and Dr. Jenkins are certainly susceptible to cross-examination on the scope of the data that they analyzed, but if the Government wishes to present information limited to the dates charged in the indictment, it may do so at its own peril.

C. The Defense Objection to Dr. Jenkins' Report as Unreliable

The Defendants also challenge Dr. Jenkins' report as unreliable based on a number of factual and transcription errors [DE 200 at 21-23]. At the hearing, defense counsel vigorously cross-examined Dr. Jenkins on these errors, and Dr. Jenkins requested the opportunity to review his report and conclusions [Tr. at 293]. Dr. Jenkins reviewed his report and made changes, and the Government submitted the revised report with its post-hearing brief [DE 195-5]. The Defendants submitted an affidavit detailing what it argues are errors in the Jenkins report. Specifically, it alleges that a number of transcription errors, omissions, and mathematical errors are present in the report [DE 193-2]. The Defendants also challenge Jenkins' use of 8 a.m. as the time that the Defendants took the grab sample to test for *E. Coli* [DE 193-2 at ¶¶ 6A, 6C]. The Defendants argue that for the 69 dates on which the indictment alleges overt acts of the conspiracy, the grab sample was only taken within 30 minutes of 8 a.m. on only 23 occasions [Id.; DE 193 at 46]. According to the defense, this assumption is incorrect and undermines Dr. Jenkins' opinions that samples were taken at the time when flow into the plant was at its lowest and chlorine concentration was at its highest.

The Government argues that Dr. Jenkins is qualified to testify as an expert in wastewater treatment practices, and that the defense has not challenged his qualifications [DE 199 at 17].

The Government admits that Dr. Jenkins' report had some flaws, but argues that "the results of the calculations on each table were not significant," and that Dr. Jenkins' corrected report shows only minor changes in the supporting tables [DE 199 at 18-19]. Moreover, Dr. Jenkins did not change his opinions regarding chlorine dosing or flow rates at the sample times as a result of his corrected report [DE 199 at 19].

While Dr. Jenkins admittedly made a number of errors in his report, I find that they were not so pervasive as to render his testimony unreliable to present to the jury. Dr. Jenkins' use of data from various sources to come to his conclusions likewise does not render his report so inaccurate to present his opinions to the jury. The Defendants are free to cross-examine Dr. Jenkins on the preparation of his initial report, the preparation of his subsequent report, his use of 8 a.m. as the sampling time in both reports, and any errors that it identifies in the subsequent report. These objections to Dr. Jenkins' report do not rise to the level needed to exclude the report and Dr. Jenkins' testimony in their entirety.

D. The Defense Objection to Kuss' Proposed Testimony

The Defendants have also objected to the proposed expert testimony of Michael Kuss. Kuss did not testify at the August hearing, but the Defendants have challenged Kuss's testimony on several grounds. First, they argue that Kuss cannot testify about the CWA and its regulatory framework because it is essentially testimony about what the law is, which is not an appropriate subject for expert testimony, and that even if it was, Kuss isn't qualified to give such testimony because he is not a legal expert [DE 115 at 4-10]. The Defendants also contend that Kuss cannot testify about civil fines or injunctive relief for CWA violations, because such testimony is irrelevant to a criminal prosecution and could mislead the jury [DE 115 at 7, n.4]. The Defendants also object that Kuss is not qualified to "explain how the GSD was designed to

operate,” because Kuss is not a Professional Engineer [DE 115 at 10]. The Government argues that Kuss will not be testifying about what the law means; rather, he will be “explaining the statutory and regulatory framework of the CWA,” “will explain various statutory terms and define words important to the scheme which he relied upon as a regulator” [DE 125 at 4, 7].

I will reserve ruling on Kuss’s proposed testimony until I am able to hear it first hand at trial. But I will note that “[e]xperts are permitted to testify regarding how their government agency applies rules as long as the testimony does not incorrectly state the law or opine on certain ultimate legal issues in the case.” *United States v. Davis*, 471 F.3d 783, 789 (7th Cir. 2006). “[E]xperts are allowed to testify about how they enforce regulations, whether transactions comply with regulations, and how they ensure that the public knows about regulations.” *Id.* Based on the Government’s notice, it would seem that the testimony of Kuss, who worked at IDEM for 26 years as a wastewater engineer, would fit squarely into this rubric. And because Kuss may only testify about how IDEM enforced and applied regulations, he need not be a lawyer or legal scholar.

As to the specific issue of testimony about civil fines and penalties available to IDEM and the EPA, I will also reserve ruling until trial. I need to see precisely what his testimony will be in this regard. Again, though, I note the Defendants are specifically charged with conspiring to defraud the Untied States by hampering “the lawful and legitimate functions of the U.S. E.P.A. in administering and enforcing federal environmental laws and regulations” [DE 1 at ¶ 20; DE 125 at 10]. Given that these penalties are part of the object of the charged conspiracy, they are at least preliminarily relevant but only to an extent. The devil is in the details, and I cannot evaluate those details until I hear the testimony at trial outside the presence of the jury or through a government proffer.

The Defendants also argue that Kuss' lack of engineering credentials bars him from testifying as an expert about how the plant was *designed* to operate, and that testimony about his personal knowledge of the GSD plant is simply the province of a fact witness. I find that Kuss can testify about the design and operation of the GSD plant. Kuss has an engineering degree and worked as an inspector of POTWs for 26 years. He is presently the superintendent of a POTW and holds a Class IV wastewater operator's license, which authorizes him to supervise the state's largest and most complex POTWs. Given Kuss' experience and training in the wastewater treatment field, coupled with his background and experience with the GSD plant itself, I find that his qualifications are sufficient to testify about the design and operation of the GSD plant.

II. The Defense's Proposed Experts

The Government objects to the Defendants' proposed expert testimony on two grounds: first, that it is not relevant to the issues that will be presented at trial; and second, that the testimony is not based upon sound methodology [DE 195 at 18]. I will take up these arguments in reverse order.

A. Government Objections to the Defense Experts' Methodology

The defense proposes to offer expert testimony regarding the so-called "Ct analysis." Ct analysis measures disinfection performance [DE 111 at 4-5, 12-13; DE 200 at 15-16]. The defense experts propose to testify that disinfection performance is measured in terms of Ct; that the GSD plant maintained Ct levels over a particular amount at all times, not just at the time of the grab sampling; and that when Ct levels are at a particular level, effective disinfection has been achieved [*Id.*]. In other words, the defense experts will testify that because the Ct levels were always above a certain level, the plant was always achieving effective disinfection. In layman's terms, *E. Coli* was always being killed. Because *E. Coli* was always being killed,

adding more chlorine wouldn't make the *E. Coli* "more dead," and so the grab sample – whenever it was taken – would always show the same thing, which was that *E. Coli* was killed.

The Government claims that this line of testimony is not accurate. In particular, it attacks Hurst's testimony on the ground that he opined only that the presence of a free chlorine residual at the end of the chlorine tank indicates that bacteria, including *E. Coli*, have been killed, but that he would not state that "all bacteria" had been killed [DE 195 at 26; DE 199 at 12; Tr. at 146-151]. According to the Government, because this testimony essentially means that "*some E. coli* were killed under the circumstance he described," the testimony is too "weak" to be "helpful to a trier of fact" [DE 195 at 27], and undermines Hurst's opinion testimony that because there was always a free chlorine residual maintained, there was a constant lack of *E. Coli* [Tr. at 47-48].

I find that Hurst's testimony that the presence of a free chlorine residual at the end of the disinfection process indicates that *E. Coli* has been killed is appropriate for the jury to hear and will assist it in assessing the evidence. Hurst testified about the science behind chlorine disinfection and how it works to kill *E. Coli*, and I find that this testimony is sufficiently reliable and would assist the jury in determining whether the Defendants tampered with the monitoring method. The Government's claim that this testimony is "weak" is an argument going to the weight of the evidence, not to its admissibility. *See Metavante Corp. v. Emigrant Sav. Bank*, 619 F.3d 748, 762 (7th Cir. 2010) (finding that objections to weak expert testimony "do not go to admissibility but to the appropriate weight that should be accorded to the evidence"). This is because "[d]eterminations on admissibility should not supplant the adversarial process; 'shaky' expert testimony may be admissible, assailable by its opponents through cross-examination." *Gayton v. McCoy*, 593 F.3d 610, 616 (7th Cir. 2010). Weak evidence (if this evidence can be so

characterized) is best exposed through cross-examination, not through outright exclusion.

The Government also raises a related objection to the defense experts' testimony. At the hearing, Hurst and Dr. Tchobanoglous testified that the U.S. EPA has not promulgated a standard Ct value for wastewater treatment [Tr. at 135, 212]. While the State of California has promulgated such a standard, Hurst and Dr. Tchobanoglous did not use that standard. Instead, they used a value of 1.5 mg-min/L, which is significantly smaller than the California standard [Tr. at 212]. Dr. Tchobanoglous testified that according to *Metcalf and Eddy*, a treatise that both side's experts agreed was a widely used text in the wastewater treatment field, a site-specific study is required to determine the proper chlorine dosing for each specific wastewater treatment plant [Tr. at 216]. Neither Hurst nor Dr. Tchobanoglous performed such a study, although Dr. Tchobanoglous testified that a site-specific study for the Gary plant was performed by United Water engineers, and they concluded that a residual of .50 mg/L should be maintained [Tr. at 185-87, 216]. (Indeed, the indictment itself states that "United Water personnel determined that the free chlorine residual generally had to be at least .50 mg/l to achieve a sufficient reduction ("kill") of *E. Coli* in the water to be discharged in compliance with the NPDES permit to the Grand Calumet River" [DE 1 at ¶ 15B].) The government claims that Dr. Tchobanoglous' testimony about Ct is vague and unreliable because he was not able to articulate why he used a value of 1.5 mg-min/L as a benchmark for adequate disinfection [DE 195 at 30-31; Tr. at 212-216].

Relatedly, the Government makes other challenges to Hurst's testimony – and Dr. Tchobanoglous's reliance on it – about a Ct benchmark. It claims that Hurst used assumptions based on laboratory tests to determine how long water was in the chlorine contact chambers at the Gary plant, instead of performing tests at the Gary plant itself; failed to use a "baffling

factor” when coming to his conclusions; failed to properly consider various types of bacteria; and based his conclusions on average amounts of *E. Coli* that came into the plant, even though the amounts could have been higher [DE 195 at 24-25]. The government also argues that Dr. Tchobanoglous’ opinions about are additionally unreliable because they are based on an assumption of effective chlorine mixing and did not take into account the effects of sludge accumulated at the bottom of the chlorine contact chamber [DE 195 at 30, Tr. at 210, 211].

Again, I find that these objections do not rise to the level of showing that the defense experts used an improper methodology in coming to their conclusions. The science behind “Ct analysis” is well-established and accepted by those in the field of wastewater treatment [DE 195-5 at 3; DE 111 at 4-5; DE 200 at 18-19]. The Government’s objections do not demonstrate that the defense experts misapplied the methods for determining Ct. Rather, at the risk of sounding like a broken record, these are all points on which the Government can cross-examine the defense experts. But as a matter of admissibility, I am satisfied that the methodology the experts used to arrive at the conclusions, and the manner in which they applied the facts to the method, is proper.

Finally, the Government argues that Hurst’s opinions regarding the diurnal flow rate into the Gary plant were misleading because 1) he used inflow data from the entire time of the charged conspiracy, instead of just the dates where overt acts are alleged; and 2) the presentation of the information on the y-axis of his chart manipulates the true flow rate information and could lead the jury to believe that the flow rate fluctuated more than it actually did [DE 195 at 27, Tr. at 117-18, 124-25]. As an initial matter, I find that the presentation of the information is not a sufficient basis on which to exclude this testimony. It’s no surprise that the chart has been drawn to present the information in the manner that is most advantageous to the defense position. But

the central issue is whether the information on the chart is accurate, and it is. At least the government does not claim the contrary. So what the Government's argument boils down to is a matter of aesthetics. I find that the chart is not so misleading that it would confuse the jury, and therefore it will be permitted.

What bears more discussion, however, is the Government's objection regarding the defense experts' use of data from days that were not explicitly charged in the indictment, but which span the time of the charged conspiracy. As discussed above, this objection relates to the parties' fundamental differences about whether the dates that are not specifically charged in the conspiracy are relevant. The Government's experts will not be required to present evidence regarding each day of the entire period of the charged conspiracy, but I also find that the defense experts may use data from the entire period of the charged conspiracy to make their conclusions and form opinions, and perhaps show that the Government engaged in cherry picking when it decided which days to charge as overt acts and substantive counts. As will be discussed more fully below, the Defendants' intent is relevant to this case, and their observations regarding the inflow of water into the plant on a daily basis certainly informed their decisions regarding chlorine dosing. The general patterns of inflow for the period that ran throughout the charged conspiracy is relevant, and the defense experts may use that data in their testimony.

The government challenges the factual bases of Dr. Tchobanoglous' opinions about factors that would cause fluctuations in chlorine dosing. Specifically, the Government challenges Dr. Tchobanoglous' testimony about the clarifiers used at the GSD plant, solid washout from the clarifiers, and the GSD plant's problems with ammonia leakage [DE 195 at 32-34]. Dr. Tchobanoglous testified that the clarifiers used were shallow, would fill with sludge, and cause solids to wash out into the chlorine contact tank, prompting the operators to increase

the amount of chlorine, and then return to lower levels once the problem was dealt with [Tr. at 178-80]. On cross-examination, Dr. Tchobanoglous admitted that according to his book, the GSD clarifiers were an industry-standard size and that he did not know when certain clarifiers were online [Tr. at 191, 193]. The Government also challenged Dr. Tchobanoglous' testimony about the depths of sludge blankets and ammonia leakage, which could be a reason to increase chlorine dosing [Tr. at 188, 192-94, 199].

As the defense points out, Dr. Tchobanoglous' opinion was based on his review of data from all dates on which GSD was subject to permit requirements, not only the days specifically charged in the indictment [DE 200 at 19-20]. While Dr. Tchobanoglous is certainly susceptible to cross-examination about the information that he used to reach his opinions on these issues, I do not find that the testimony elicited at the hearing is sufficient to show that he did not base his opinions upon sufficient facts or data.

B. Government Objections to the Defense Experts' Relevance

As to the relevance issue, the Government contends that I should exclude all testimony that "after-the-fact calculations show the *E. Coli* numbers would not have been elevated notwithstanding their tampering" [DE 195 at 19]. The Government argues that because environmental harm or permit violations are not at issue here, this testimony is irrelevant [DE 195 at 18-20]. Additionally, the government argues that the testimony regarding flow fluctuation "can only be introduced upon establishing a factual predicate that that was in fact the reason for boosting the chlorine concentration" [DE 195 at 28].

Essentially, the Government's position is that whether the Defendants released levels of *E. coli* and violated the permit is irrelevant, because requiring the Government to show that the permits were violated would require them to prove something beyond the elements outlined in

the statute. In other words, they argue that environmental harm is irrelevant. But even if the Government need not prove that the permits were violated, if the Defendants were, in fact, achieving a good kill, as evidenced by the presence of a free chlorine residual at the end of the disinfection process, it is less likely that the Defendants were, as the Government argues, up to no good in the operation of the plant and increasing the chlorine levels at the time that the samples were taken for the nefarious purpose of influencing the sample. This evidence is relevant because if the Defendants were not violating the permits, it is less likely that they were somehow corruptly increasing the chlorine levels at the time the grab sample was taken.

As to the Government's argument that testimony regarding flow fluctuation will require a "factual predicate," it is clear to me that the experts' proposed testimony sheds light on how the GSD plant was operated on a day-to-day basis, which is certainly relevant to the Defendants' mental state. The Defendants argue – it would seem correctly, based on the testimony presented at the hearing – that the Government intends to put on evidence at trial that the Defendants tampered with the monitoring method by increasing the level of chlorine, taking the grab sample, and then turning down the level of chlorine for the rest of the day [DE 193 at 34]. Evidence that tends to show that there is an innocent explanation for increasing and decreasing the chlorine levels – that the inflow into the plant was higher at certain times than at other times – would certainly be relevant to the Defendants' mental state and intent.

III. CONCLUSION

Based on the above reasons, the Defendants' Motion to Exclude the Proposed Expert Testimony of Michael Kuss [DE 113] is taken under advisement to be ruled on at trial; the Defendants' Motion to Exclude the Proposed Expert Testimony of Trent Rainey and Dr. David Jenkins [DE 117] is **DENIED**; and the Government's Motion to Limit the Testimony of Defense

Experts George Tchobanoglous and Charles Hurst [DE 136] is **DENIED**.

SO ORDERED.

ENTERED: October 19, 2012

s/ Philip P. Simon
PHILIP P. SIMON, CHIEF JUDGE
UNITED STATES DISTRICT COURT